

## Internet Government Forum: Policy Options for Connecting and Enabling the Next Billion GSMA Submission

The GSMA welcomes the opportunity to respond to the on Phase II of the IGF intersessional theme '*Policy Options for Connecting and Enabling the Next Billion*'. The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA has a wide variety of programmes and, in particular, our Mobile for Development Programme brings together our mobile operator members, the wider mobile industry and the development community to deliver mobile services to underserved people in predominantly emerging markets. We identify opportunities to foster connected societies, accelerate the mobile money ecosystem, and develop mobile identification. Additionally we work to stimulate the development of scalable, life enhancing mobile services with the maximum social and economic impact. Since the establishment of GSMA Mobile for Development, we have partnered with 50 mobile operators, enabled the roll out of 104 initiatives and impacted lives across 49 countries.

### 1. How would you define, or how do you understand the theme '*Connecting and Enabling the Next Billion*'?

Over the last couple of decades, the internet has been at the centre of a transformative shift in how we connect with one another. We live in a world where communication is quicker, information is more available, commerce more efficient and entertainment and education more easily accessible than ever before. Sadly, to date only a minority of the world's citizens have been included. Globally, 4 billion people remain unconnected, nearly all of whom (90%) are in the developing world.

While this 'digital divide' continues to persist, the rapid growth in access to mobile internet offers huge grounds for optimism. Ten years ago, less than 10% of the population in Africa, Asia, the Pacific and the Arab world were online. In the decade since, this has increased dramatically, mainly driven by the growth of mobile. For illustration: between 2010 and 2015, fixed line broadband penetration in the developing world had a compound annual growth rate of 11% compared with 54% for mobile broadband.<sup>1</sup>

As a result, the mobile industry is increasingly looking towards the developing world to provide future growth: more than 90% of the incremental 1 billion new mobile subscribers forecast by 2020 will come from developing markets. The number of smartphone connections globally will increase by 2.6 billion by 2020, and again around 90% of that growth will come from developing regions. China is already the largest smartphone market, but India will be the real growth driver; it is set to add almost half a billion new connections over the next five years.<sup>2</sup> Of the 4.3 billion adult population living in developing world markets, 2.5 billion adults are not connected to the mobile Internet (3.3bn if we exclude 2G mobile internet connections). This represents an untapped opportunity for consumers, governments and industry and one that can deliver both positive social and economic impact.

Today, an estimated 30% of the developing world adult population (1.3bn people) are not covered by broadband (3G/4G) mobile networks (compared to less than 5% across developed world markets). The coverage gap is particularly acute in Africa where 50% of the population falls outside the footprint of 3G

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<sup>1</sup> Source: [ITU](#). Between 2010 and 2015, mobile broadband subscriptions went from 4.5% to 39.1%, fixed line broadband increased from 4.2% to 7.1%

<sup>2</sup> [GSMA Mobile Economy 2016](#)

networks.<sup>3</sup> The economic case for mobile operators to expand coverage into remote areas is challenging because of the cost of deploying, maintaining and powering cell towers in remote, off-grid locations, lower revenues expected from thinly spread, low income populations and policy barriers such as availability of low frequency spectrum (see response to question 3 for more detail).

However, even where network coverage is already available, considerable barriers to adoption of mobile internet services remain. An estimated 2 billion adults in developing world markets already live within a 3G/4G network footprint but do not use broadband mobile internet services. The implication of this is clear: connecting the next billion to the internet is not simply a question of infrastructure. Locally relevant content ecosystems are under-developed, digital illiteracy abounds and affordability issues compromise people's ability to connect, a low-income groups. The digitally excluded either do not know how to access the internet, have the misconception that the internet is only useful for entertainment and therefore not of value, or are frustrated by the lack of content and services in native languages. Women in particular experience these barriers more acutely than men due to social norms and disparities in terms of education and income.

To exploit these opportunities for economic growth and social development, the GSMA's Connected Society programme is working with GSMA members, the wider ecosystem, governments, non-governmental organisations and other stakeholders to address each of the barriers, to ensure that the billions currently not online can be connected and enabled (see response to question 4 for more detail)

**3. Are you aware of any specificities around connectivity at a local or regional level? (In other words, do you know of factors that impact connectivity in, for instance, rural areas but less so at an urban level? Or factors that affect connectivity at regional or larger scale, but not as noticeably at local or smaller scale?)**

For mobile operators, the market-led business model has proven effective in expanding coverage to the majority of the world's population, who now lives within access of a mobile network. 78% of the world's population now live within access of a 3G network. However, the vast majority of the uncovered population lives in rural locations with low population densities, low income levels and weak or non-existent enabling infrastructure such as electricity and high-capacity fixed communications networks. These characteristics have a profound adverse impact on all aspects of the business case for mobile network expansion – higher capital investment costs per site, higher operating costs and a significantly lower revenue opportunity.

As a result, closing the mobile coverage gap is not a technical challenge, but an economic one. The revenue opportunity for new base stations in rural or remote locations can be as much as ten times lower than in an equivalent site in an urban area. The operating costs can be as much as three times higher and the capital investment costs up to two times higher. There are four key issues in these areas:

- **Population density:** 60% of the world's population live in rural areas, with 20% in remote areas.<sup>4</sup> Extending mobile broadband coverage to address these populations is extremely difficult, as people are spread out across wide areas making the business model of building mobile towers in such areas highly unprofitable. Rural areas represent over 90% of the land surface on earth with population density often below 100 people per square kilometre. We estimate that in order to be viable a site needs around 3000 active users on a daily basis.

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<sup>3</sup> Source: GSMA

<sup>4</sup> Source: World Bank

- Difficult terrain:** Mountains, dense forest and islands among other geographic features complicate significantly the network roll out process when it comes to extending coverage to rural and remote populations. Often such projects require building up extensive microwave or fibre backhaul networks crossing seas and inhabited lands. Where the roll out of terrestrial backhaul is not feasible, such as in dense forest, mobile operators often have to rely on expensive satellite bandwidth to connect remote areas to their core network. In addition to the terrain, climate can also have a detrimental impact as satellite signals are often vulnerable to high humidity levels and violent events such as storms that can occur on a regular basis during the rainy season in tropical areas.
- Lack of basic infrastructure:** Network deployment to rural and remote locations is adversely impacted by a lack of basic infrastructure such as reliable power provision, road access or public buildings. Mobile operators must, as a result, build each site in a self-sufficient manner adding to the up-front deployment costs and ongoing operations and maintenance costs. Africa and to a lesser extent South-East Asia are affected by the lack of basic infrastructure.
- Low per capita income levels:** In addition to being sparsely populated, rural and remote areas across developing world markets are typically inhabited by the poorest segment of the population living significantly below the country's average GDP per Capita. In Tanzania for instance, where average GDP per Capita was estimated at US\$3,680 at YE2015, the income per working adult in the countryside was not above US\$100 per month - 3 times below national average.<sup>5</sup> As a result, even if rural and remote populations have a strong demand for mobile internet services, their ability to pay is significantly reduced compared to urban populations.

**Figure 1: Key drivers of the business case for network coverage expansion**

Input	Drivers	Impact of rural and remote locations		
Revenue Opportunity	Population density	✓✓✓	Base stations in rural and remote locations typically have a significantly reduced addressable population with limited spending power	0.1x to 0.5x <i>relative to an urban base station</i>
	Per capita income levels	✓✓✓		
Operating Costs	Site rental	✓	The lack of basic enabling infrastructure such as power and fixed-line infrastructure means operating costs for rural and remote base stations are typically significantly higher	1.5x to 3.0x <i>relative to an urban base station</i>
	Power	✓✓✓		
	Backhaul capacity	✓✓✓		
	Maintenance	✓✓		
	Sales and marketing	✓✓		

<sup>5</sup> Source: World Bank

<b>Capital costs</b>	Site preparation	✓	Base stations in rural and remote locations need to be prepared to cope with higher levels of physical security and resilience and more expensive solutions for power (e.g. hybrid/diesel generators) and backhaul (e.g. microwave and satellite)	1.25x to 2.0x <i>relative to an urban base station</i>
	Power supply	✓✓		
	Active network elements	✓✓		
	Backhaul equipment	✓✓✓		
	Maintenance	✓✓		

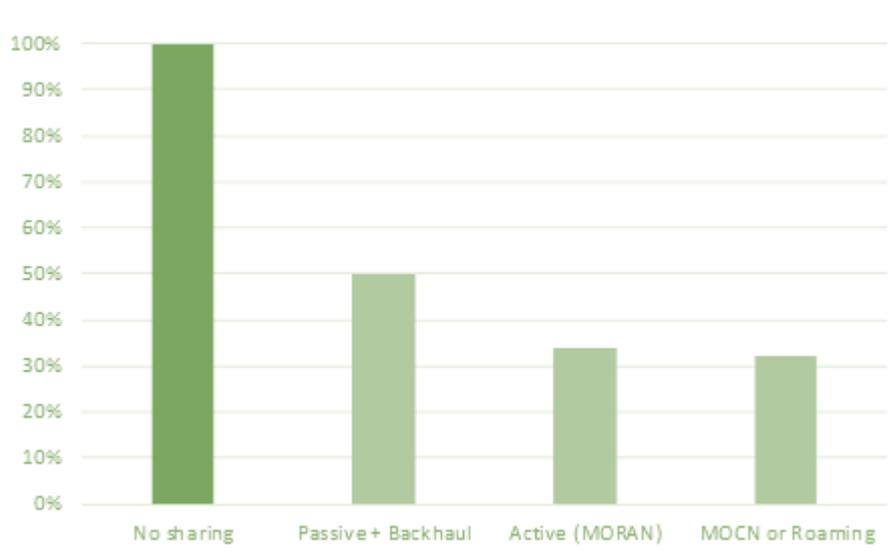
*Return on Investment per base station is significantly impaired in rural and remote locations due to higher capital costs, weaker revenue opportunity and higher operating costs*

Source: GSMA

As a result of these factors, mobile operators are increasingly adopting alternative methods to network coverage expansion, notably infrastructure sharing and partnerships with other ecosystem players, to complement traditional network deployments.

Infrastructure sharing models can have a profound, positive impact on the economics of network expansion into rural and remote areas. They allow each operator to reduce their capital and investment costs by as much as 50-70% whilst maintaining the original revenue opportunity.

**Figure 2:** Impact of different infrastructure sharing models on operating and capital costs over five years for rural/remote network expansion



Source: Coleago

Through infrastructure sharing models, the mobile industry is able to increase the proportion of the population that can be covered on a commercially sustainable basis without the need for public

subsidies or development funding. This should be seen by governments and policy makers as the preferred approach to expanding the footprint of mobile connectivity as it preserves competition and commercial sustainability.

There a number of variations to the infrastructure sharing model that can be considered by mobile operators. The ultimate choice will depend on a range of factors including the prevailing regulatory environment, market characteristics and individual operator strategies.

The key options that are usually considered include:

- Network roaming – where operators agree to allow each other’s customers to roam onto their respective national networks where they don’t have their own coverage
- Sharing of passive elements such as towers, buildings, power supply
- Sharing of active elements such as radio equipment, backhaul capacity or core network functions

Some examples of successful rural infrastructure sharing projects are set out below:

	Partners	Technology Scope	Geographical Scope	NRA Role
<b>Austria</b>	3 and T-Mobile	Roaming	Rural	No
<b>Bangladesh</b>	Banglalink and Grameenphone	Passive	Rural only	No
<b>Finland</b>	TeliaSonera and DNA	MOCN	50% of geo., 15% of pops	No
<b>France</b>	SFR and Bouygues	MORAN	57% of pops	No
<b>Greece</b>	Vodafone and Wind	MORAN	70% of rural, 40% urban	No
<b>Sweden</b>	Telenor and Hutchison	MOCN	70% pops	Yes
<b>Venezuela</b>	Movilnet, Movistar and Digitel	Passive	30 sites in first phase	Yes

To facilitate this, governments should look to move policy, legislation and regulation towards best practice in a number of specific areas including:

- Cost effective access to low frequency spectrum
- Support for spectrum re-farming
- Support for all forms of voluntary infrastructure sharing
- Elimination of sector specific taxation on operators, vendors and consumers
- Non-discriminatory access to public infrastructure
- Support for streamlined planning and administrative processes
- Relaxation of Quality of Service requirements
- Context appropriate competition policy, especially concerning market structure
- Support for multi-sided business models such as zero rating and sponsored data

In addition, national governments should look to direct public investment towards the development of critical enabling national infrastructure including the national power grids and even open access high capacity core fibre-based communications networks.<sup>6</sup>

**4. Data shows that the growth of internet adoption is slowing down in some areas, especially as broadband services extend to more remote, less densely populated areas (facing challenges beyond affordability and availability). What are some of the barriers or limitations preventing people who *do* have internet access from being enabled or empowered through such connectivity?**

At the end of 2015 around 4.2 billion people, 56% of the world's population, were still not connected to the internet. At present, around 1.6bn people, nearly 40% of the unconnected population, live outside the footprint of a 3G mobile network.<sup>7</sup> As discussed, the challenges of connecting this group to the internet should not be understated, given the challenging economic case for mobile operators for expanding networks into remote areas (for more detail on this issue, please see question 3).

However, it should be noted that the majority of those currently unconnected – a total of 2.6 billion people - are already covered by a mobile broadband network.

- In Asia, mobile internet, particularly mobile broadband (3G and 4G), subscriber penetration remains low in Asia, with many only using voice and text services on their phones. At present, only 27% of the region - approximately 1 billion people - subscribe to mobile broadband services (see figure 3). This means that over 2 billion people in Asia who could subscribe to mobile broadband services as they have coverage, do not currently do so.<sup>8</sup>
- Although mobile internet adoption is growing fast in Africa, over 50% of internet users still connect to the internet via a 2G network. While low-speed internet connectivity plays an important role in introducing new adopters to the benefits of mobile internet, it is broadband access via 3G and 4G networks that really unlocks the full potential of the digital economy. In, 3G network coverage is only 50% of the population, meaning that nearly 600 million people are not within reach of high-speed mobile internet connectivity. However, of those who are covered, only a small percentage today subscribe to mobile broadband services: 10% in Sub-Saharan Africa, or 100 million people, and 20% in North Africa, or 45 million people. That leaves 457 million people, of which 70% are in Sub-Saharan Africa, who are covered but do not subscribe to mobile broadband.<sup>9</sup>

Beyond affordability, the reason that these people aren't connected to the internet is due to gaps in digital skills and a lack of locally relevant content. In both areas, women experience these barriers more acutely than men due to social norms and disparities in terms of education and income, opening up a significant digital divide, and threatening to leave large segments of the population excluded from digital opportunity. Moreover, it is important to recognize that locally relevant content, mobile internet awareness and digital skills were intrinsically linked. On its own, an increase in locally relevant content won't drive engagement with the mobile internet if people don't have the skills to access and use it. Equally if people do not understand the fundamental benefits the mobile internet can bring to their lives, whether it be searching for jobs or health information, or just watching a music video, they will not be motivated to learn how to use it.

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<sup>6</sup> For detail, please consult: GSMA, [Unlocking Rural Coverage Enablers for Commercially Sustainable Mobile Network Expansion](#), July 2016

<sup>7</sup> Source: [GSMA Intelligence](#)

<sup>8</sup> For more detail, please consult: GSMA, [Consumer barriers to mobile internet adoption in Asia](#), 2016

<sup>9</sup> For more detail, please consult: GSMA, [Consumer barriers to mobile internet adoption in Africa](#), 2016

- **Digital skills:** Due to gaps in understanding, unconnected and illiterate populations are currently being left behind in the mobile internet revolution and are not benefitting from the plethora of services and life enhancing content and information that access to the mobile internet can provide. A huge amount of GSMA research has suggested that a lack of basic digital skills (e.g. knowing how to use the basic functions of a mobile phone, search for information, understand the basic navigation functions of an app) is one of the key reasons why many of those who could connect to the internet are not doing so. For this reason, the GSMA recently launched – in partnership with Telenor India and Idea Cellular – the [Mobile Internet Skills Training Toolkit \(MISTT\)](#). The MISTT has been developed for MNOs, NGOs, Development Organisations and Governments who want to provide training to improve people’s basic knowledge and understanding of the mobile internet. It provides an introduction to using the mobile internet on an entry level smartphone through three services: WhatsApp, YouTube and Google, with information about safety and cost included throughout.
- **Locally relevant content:** The uneven nature of content (i.e. images, video, text, maps and games) on the internet – heavily skewed towards those living in the developed economies – has long been recognised as an issue, with the ITU highlighting its importance as far back as 2003.<sup>10</sup> Since then, the internet has become far more accessible and affordable, but a large disparity in locally relevant content remains. Thought leaders in this field, including the Internet Society<sup>11</sup>, McKinsey<sup>12</sup>, Facebook<sup>13</sup> as well as the GSMA<sup>14</sup>, have all published research in recent years suggesting that it represents one of the key barriers to digital inclusion.

Quantifying the extent of this problem is difficult. However, the best available indicators suggest this is a serious issue. For content supply, this is the GSMA’s [Mobile Connectivity Index \(MCI\)](#), which measures the barriers and enablers to mobile internet connectivity. The Content metric on the Index suggests that content availability and relevance roughly correlate with a country’s economic status, and that developing countries, particularly in MENA, APAC and sub-Saharan Africa, suffer from a lack of locally relevant content relative to their more economically developed peers. This matters, as if people don’t have relevant content, then they will lack the incentives to come online. This matters, as we know that there are significant economic and social benefits to be gained from internet access, such as improved communication, social inclusion, productivity and access to services.

## **8. Can you think of ways in which ICTs or Internet connectivity could be used to help reach the SDGs?**

## **9. Do you know of examples of success stories that can illustrate how Internet access can help to address real-world problems (in either developed or developing countries)?**

Internet connectivity most directly relates to goal 9 – “Industry, Innovation and Infrastructure” – and, in particular, goal 9.8 – “Significantly increase access to information and communications technology and strive to provide universal and affordable access to the internet in least developed countries (LDCs) by 2020.

However, increased access to the internet through mobile is a game changer for development, in that it has facilitated a dramatic increase in the amount of information available to the average global citizen, meaning that there are far more opportunities for productive interaction and collaboration between

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<sup>10</sup> [ITU, World Summit on the Information Society 2003](#)

<sup>11</sup> Internet Society, [Global Internet Report 2015](#)

<sup>12</sup> McKinsey, [Offline and falling behind: Barriers to Internet adoption](#)

<sup>13</sup> Internet.org, [State of Connectivity: 2014](#)

<sup>14</sup> GSMA, [Digital Inclusion](#), 2014

individuals, companies and governments. The transformational impact that the internet and access to technology has had – and will continue to have – means that it can be used to help reach all the SDGs to a greater or lesser extent. In all, mobile technology will be critical in delivering 15 of the 17 SDGs. As a result,

More specifically, an increase in access to the mobile internet can particularly play a role in helping to achieve the following goals:

- Goal 3 - Good Health and Well-being:  
By providing connectivity the industry can support the wider and more effective delivery of information to both healthcare professionals and citizens. Examples include the [Uganda Mobile VRS](#) which is a mobile based system allowing healthcare staff to more accurately report births, and '[maymay](#)', a maternal healthcare application partnering with Ooredoo Myanmar to provide advice to expectant parents in Myanmar.

Innovations in connectivity have also provided healthcare professionals with smart tools to facilitate service delivery. For example, in Uganda the start-up company Cipher256 created WinSenga, an affordable smartphone-based ultrasound that directly addresses SDG 3.1 and 3.2 in reducing maternal- and neonatal mortality rates. WinSenga is a stethoscope that plugs into a mobile phone and is operated using an app. The device lets doctors and midwives monitor the health of a foetus more easily and earlier during the pregnancy, providing an effective solution to track the health of the pregnancy and raise awareness in case of complications.<sup>15</sup> Less than 40% of expectant mothers in Uganda make their prenatal health check-ups due to lack of effective equipment, under staffing and long distances to hospitals, which contributes to the country's currently high maternal mortality rate of 343 per 100,000 live births (SDG 3.1 mandates a reduced maternal mortality ratio to less than 70).<sup>16</sup>

- Goal 4 – Education:  
Mobile devices allow for the delivery of educational materials and services to a huge number of people at far lower cost than other delivery channels. Mobile will be a key tool to accelerate literacy in developing countries in line with SDG 4.6, as large numbers of people read full-length books and stories on rudimentary small screen devices where physical texts are scarce.<sup>17</sup>

Internet-enabled mobile devices further connect education providers for sharing knowledge and successful teaching practices, helping to improve the quality of education. For example, the international programme BridgeIT works to bring teacher training and educational content to teachers and classrooms through smartphones. Teachers are provided access to download a variety of educational content and teacher training material with localised teaching guides and lesson plans to their phones, and to connect with other teachers in a network of support and ongoing professional development. BridgeIT has served over 1.3 million learners through working with 2,272 schools across 10 countries in South Asia, Sub-Saharan Africa, and Latin America and the Caribbean.<sup>18</sup>

- Goal 5 - Gender Equality:  
Access to mobile helps to bring about greater gender equality by giving women more autonomy over their communications and ability to access information and services.<sup>19</sup> In the case of Kenya,

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<sup>15</sup> Microsoft News, 2016, [The heartbeat of progress](#)

<sup>16</sup> Source: World Bank

<sup>17</sup> UNESCO, 2014, [Reading in the mobile era](#)

<sup>18</sup> Center for Educational Innovations, [BridgeIT](#)

<sup>19</sup> GSMA, [Bridging the gender gap: Mobile access and usage in low and middle-income countries](#)

the Gender Inequality Index ranks the country at 126 out of 155 countries,<sup>20</sup> but the use of smartphones has opened up the potential to impact existing gender inequalities in greater access to information, entrepreneurial activity and social participation. In business, access to a smartphone in Kenya gives women the same opportunities as men in extending business contacts, increasing working hours and lifting incomes.<sup>21</sup>

There are several industry initiatives working to empower women by expanding their digital skills (SDG 5.8). One example is Intel's digital skills programme [She Will Connect](#) that was launched by Intel in 2014 across Africa, and is currently running pilots in South Africa, Nigeria, and Kenya. The training framework leverages local grassroots participation and encourages learning through peer networks and via safe online forums. This helps participants to keep learning together beyond the training period, and inspire each other to discover relevant content. The target is to reach 5 million girls with internet training across the region by 2020, and as of March this year 800,000 women and girls had benefitted from the programme across the pilot countries.<sup>22</sup>

- Goal 8 - Decent Work and Economic Growth:

Many studies, including joint research by the GSMA with Deloitte and Cisco, point to a strong link between mobile adoption and an uptick in GDP growth.<sup>23</sup> The increased productivity erupted from widespread use of mobile technology contributed to an estimated 2.2% of global GDP for 2015, or \$1.3 trillion.<sup>24</sup> McKinsey has estimated that SMEs using the internet grow at twice the pace of companies that don't.<sup>25</sup>

Mobile internet connectivity further provides a broad platform for people to gain access to the job market, and helps to reduce youth unemployment (SDG 8.6). In South Africa, where youth unemployment is at 52%,<sup>26</sup> the mobile application Ummeli helps the unemployed locate work. Ummeli automatically generates a CV based on users' answers to 12 questions that can be sent off to potential employers, and offers job seeking advice and coaching free of charge. The app had a total of 300,000 users as of 2014, with 20% securing jobs relevant to their interest area and experience, a Kenyan version is currently being developed.<sup>27</sup>

- Goal 10 - Reduced Inequalities:

Mobile connectivity can act as a platform of self-employment and income generation through eCommerce and other P2P platforms. It provides opportunities for bottom earners of the population in countries to increase their incomes by tapping into the digital economy, and accelerate progress towards SDGs 10.1 and 10.2 for economic inclusion. For instance, SOKO is an e-commerce business tool that enables local artisans in developing countries to participate in the global market place via their mobile phone. By submitting an entry form, vendor profile and product images via SMS, producers can set up a storefront on SOKO's website and market their products to online consumers around the world. On average, after two months of joining SOKO artisans increase their income fourfold. Based in Kenya, SOKO currently operates in 30 countries and has connected over 1,000 artisans to the international market.<sup>28</sup>

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<sup>20</sup> UNDP, [Gender Inequality Index](#)

<sup>21</sup> Vodafone Group, 2016, [Towards a more equal world: the mobile internet revolution](#)

<sup>22</sup> AllAfrica, 2016, [East Africa: Intel Celebrates Kenyan Women Through Mentorship](#)

<sup>23</sup> GSMA and Deloitte (2011), [What is the impact of mobile-telephony on economic-growth?](#)

<sup>24</sup> GSMA, [The Mobile Economy 2016](#)

<sup>25</sup> McKinsey Global Institute, [Internet Matters: The Net's sweeping impact on growth, jobs and prosperity](#)

<sup>26</sup> Source: World Bank

<sup>27</sup> Borgen Magazine, 2014, [South Africa Tackles Youth Unemployment](#)

<sup>28</sup> [Shopsoko.com](#)